## *Marine Corps Aviation Modernization*

### *Discussion*

The Marine Corps has initiated several significant aviation modernization programs to restore and enhance the capabilities of existing aviation platforms. This modernization effort is significant to the Marine Corps' overall recapitalization effort. It has allowed the use of current and enhanced capabilities to sustain a combat edge while the next generation of aircraft, weapon systems and munitions is developed. Vital to the Marine Corps' aviation modernization effort is the initiative to remanufacture our fleet of aging AV-8B attack aircraft. Other key aviation modernization initiatives include the F/A-18A upgrade, EA-6B upgrade, CH-53E upgrade, CH-46E Engine Reliability Improvement Program (ERIP), AH-1/UH-1 upgrade, the Advanced Tactical Airborne Reconnaissance System (ATARS), Fire Scout (VTUAV), Pioneer (UAV), and Aviation Command and Control Modernization. These efforts are vital to ensuring a capable and potent Marine Corps in the future.

***The AV-8B Remanufacture Program*** upgrades day attack aircraft into a more capable radar/night attack variant. The wing and many original items are retained. Added to a new fuselage are a night attack avionics suite (Navigation FLIR, digital moving map, color displays, Night Vision Goggle lighting) and a surplus APG-65 multi-mode radar from the F/A-18. The aircraft receives the more powerful and reliable Pegasus (408) engine and an additional 6,000 hours of airframe life for 80 percent of the cost of a new aircraft.

As a further improvement in the capability of the aircraft, the AV-8B will receive a significant increase in lethality and survivability through the procurement of the Litening II targeting pod. The third generation Forward Looking Infrared (FLIR), dual Field of View TV seeker, and IR marker will provide improved target recognition and identification while the Laser Designator and Laser Spot Tracker will provide precision targeting capability. The Litening II will enable the AV-8B to engage targets at substantially increased ranges while employing current and future generations of precision munitions, thus improving survivability in the modern battle space. Furthermore, the enhancements to precision engagement of targets will reduce the risk for collateral damage and fratricide.

***The F/A-18A Upgrade*** consists primarily of avionics and hardware upgrades which allow the F/A-18A to process and utilize the updated versions of the F/A-18C software and accessories. The modified "A" aircraft will be compatible with Lot XVII F/A-18C aircraft; an aircraft 8 years newer. This upgrade program will enable the "A" aircraft to employ all current and programmed future weapons. A large portion of this modification enhances commonality between

the “A” and “C” aircraft, which reduces the logistics footprint and reduces pilot and maintenance training, as well as mitigating obsolescence issues. The Marine Corps expects the “A” model aircraft to remain in the active inventory until the 2015 timeframe.

***EA-6B Upgrades*** maintain Marine Prowlers as an essential combat-proven part of the MAGTF and the Joint force. The cornerstone of the modification, repair, and upgrade plan is the Block 89A-weapon system upgrade. Block 89A includes ARC-210 radios (SINGARS/Have quick capable), Embedded Global Positioning System/Inertial Navigation System (EGI), and an enhanced AYK-14 mission computer. Block 89A is the baseline aircraft configuration for the next and last expected major weapon system upgrade for the Prowler, the ICAP 3. The ICAP 3 weapon system will be a major warfighting capability that improves the receiver suite for the first time in 30 years. The improved receivers will enable more precise jamming while also improving aircrew situational awareness and reducing lifecycle costs. As the EA-6B fleet begins to reach the end of its airframe service life, the re-winging and upgrades are critical to extending the aircraft’s viability through 2015. The Marine Corps is scheduled to receive 10 Block 89A’s in FY01 and FY02 for a total of 20 aircraft. ICAP 3 is scheduled for introduction in FY05.

***The CH-53E Upgrade Program*** is a cost-effective solution to maintaining the Super Stallion as the premier heavy lift aircraft through the year 2025 when a Joint Common Lift aircraft can be procured. The current fleet of aircraft begins to reach the end of its service life in this decade. Beyond service life extension needs, a comprehensive upgrade is also required to effectively meet the MAGTF warfighting requirements over the next 25 years. To properly and economically support shipboard-based expeditionary maneuver warfare for the Marine Corps in the 21*st* century, upgrades to the CH-53E will address increased range and payload, Operations and Support (O&S) cost reductions, commonality-where possible-with other Assault Support platforms, and digital connectivity and interoperability. The CH-53E upgrade program is specifically designed to focus on these areas using a six-pronged effort:

***MV-22/KC-130J*** engines, improved main rotor blades, improved external cargo hook system, elastomeric rotor head, common cockpit, and service life extension. At roughly one-fifth the cost of a replacement aircraft, these upgrades are predicted to reduce O&S costs by 25 percent while more than tripling the payload of the aircraft.

***The CH-46E Engine Reliability Improvement Program (ERIP)*** is essential to keep the CH-46E a viable and supportable airframe throughout the Marine aviation “transformation” until its full replacement by the MV-22 Osprey. By

replacing the T58-GE-16 engine core and accessories, ERIP will arrest the downward trend in engine health, increase engine reliability, and restore operational power margins while providing a significant reduction in fleet labor and support costs.

***The AH-1 and UH-1 Upgrade*** is essential to ensuring the MAGTF possesses credible rotary-wing air support and utility support platforms for the next 20 years. In 1995, the Secretary of the Navy approved the Marine Corps program to upgrade both utility and attack helicopters. This program, known as the H-1 upgrade, modernizes the entire fleet (acquisition objective of 100 UH-1Y and 180 AH-1Z aircraft). The H-1 remanufacture program builds on the existing aircraft capabilities, takes advantage of planned improvement programs (COMNAV, Electronic Warfare and NTIS), and upgraded systems to provide the Marine Corps with an advanced fleet of utility and light attack helicopters. At the center of the upgrade is the installation of a four-bladed rotor system, a newly developed drive train, and a more powerful T700 engine. The addition of an integrated glass cockpit with modern avionics systems will provide a more lethal platform as well as enhanced Joint interoperability through the digital architecture and the installation of DCS 2000 radios. In sum, this program incorporates all previously funded or planned modifications into one program, avoiding the cost of a "new start" replacement aircraft.

Additionally, the H-1 upgrade program uses components that are 85 percent common between the AH and UH aircraft and has coined a new word "identicality." Through use of the same major components — drive train, cockpit and software — logistical support requirements will be greatly simplified resulting in more space available on already space-constrained amphibious and MPF ships. Moreover, these improvements will make the Marine Corps' attack and utility helicopter capabilities more compatible with the performance demands of all future warfighting concepts.

Operational enhancements include a dramatic increase in range, speed, payload, and lethality of both aircraft while significantly decreasing their logistic footprint. The utility variant will operate at twice the current range with double the payload. The attack variant will realize similar performance increases with the ability to carry twice the current load of precision-guided munitions. Both aircraft will achieve cruise speeds of over 150 knots.

The H-1 upgrade program is an economical and comprehensive upgrade of both UH-1N and AH-1W helicopters that will resolve existing operational safety issues while significantly enhancing the capability and operational

effectiveness of the attack and utility helicopter fleet. A key modernization effort, the H-1 upgrade will provide a bridge until the introduction of an advanced rotorcraft design in the 2020 timeframe.

***The Advanced Tactical Airborne Reconnaissance System (ATARS)*** is designed for the F/A-18D to restore a manned airborne reconnaissance capability to the MAGTF. The ATARS incorporates multiple sensor capabilities including electro-optical, infrared, and synthetic aperture radar. The man-in-the-loop remains the strength of this system. ATARS equipped aircraft will carry all sensor capabilities simultaneously. This multi-sensor capability will be completely selectable by the aircrew in flight. Another significant capability of ATARS is its ability to digitally transmit collected data in near real time to ground receiving stations. This information can be provided to various information/intelligence systems for national exploitation via the Joint Service Imagery Processing System-Tactical Exploitation Group (JSIPS-TEG). Consequently, ATARS, with its significant capability, is poised to become a major contributor in the national imagery arsenal.

***Unmanned Aerial Vehicles (UAVs)*** will grow in importance as the capability of these futuristic machines is developed. The Pioneer System will remain the Marine Corps' backbone UAV until a replacement is fielded. The program to replace the Pioneer UAV is the Vertical Takeoff and Landing (VTOL) UAV abbreviated as the (VTUAV) program. The Naval Services have selected Northrop Grumman's "Fire Scout" system as the future VTUAV. The "Fire Scout" provides significant improvements over the current Pioneer capability. The "Fire Scout" will initially be equipped with an

Electro/Optical/Infrared/Laser Designator payload capable of detecting targets up to 6 kilometers away. The Tactical Control Station (TCS) remains central to developmental efforts. TCS will give the Corps a Ground Control Station (GCS) with tremendous growth potential as well as connectivity with the whole family of UAVs from tactical to the High Altitude Endurance UAVs. Additionally, TCS will provide the UAV GCS interoperability with a variety of intelligence nodes. The Marine Corps Warfighting Laboratory has focused their UAV efforts on developing the "Dragon Eye" UAV. The "Dragon Eye" is a small packable UAV designed for small unit reconnaissance. This experiment was initiated to support the Secretary of the Navy's desire to develop, test, and, if successful, readily provide the equipment to the operating forces.

***The Marine Air Command and Control System (MACCS)*** modernization effort to improve air command and control capabilities involves the fielding of seven developmental systems in the FY04 to FY06 timeframe. This "MACCS Convergence" of new systems will provide the ACE commander with the necessary hardware, software, equipment, and facilities to effectively command and control the Joint Strike Fighter, MV-22 Osprey, and modernized Cobra attack and Huey utility helicopters. The key themes of the "MACCS Convergence" include: (1) expeditionary packaging, (2) modern information technology, (3) Joint interoperability, and (4) exclusive operation by Marines. The following systems will enhance Marine aviation's contribution to Expeditionary Maneuver Warfare:

- ***Common Aviation Command and Control System (CAC2S)*** will provide a suite of common equipment utilized in air, land, and sea-based configurations. It will enable the migration of aviation command and control agency functions away from single-function, "stove piped" operations toward multi-functional nodes that may be task organized for a variety of mission requirements. CAC2S will provide battlespace situational awareness incorporating intuitive displays, information management, imbedded training and simulation, self-test and diagnostic capabilities and command dissemination to the MAGTF C4I Command Information Architecture for real-time combat direction of aviation missions. The information provided by CAC2S will be interoperable with MAGTF C4I, Naval, and Joint command information systems.
- ***Multi-Role Radar System (MRRS)*** is a highly mobile, HMMWV mounted, multi-role, modular, medium-range air surveillance radar designed to provide an early entry air surveillance capability ashore.

- ***Complimentary Low Altitude Weapons System (CLAWS)*** will take advantage of the Advanced Medium-Range Air-to-Air Missile (AMRAAM) capability mounted on a HMMWV. CLAWS will provide the MAGTF with a rapidly and easily deployed, highly mobile, maneuverable, high firepower, air defense asset.
- ***Air Surveillance and Precision Approach Radar Control System (ASPARCS)*** is the next generation highly mobile, HMMWV mounted, expeditionary air traffic control equipment.
- ***The AN/TPS-59 Radar*** provides long-range, three-dimensional, land-based air surveillance for the MAGTF optimized for Theater Ballistic Missile (TBM) and conventional air breathing target detection and tracking. The AN/TPS-59 Radar will undergo a Service Life Extension Program (SLEP) to improve expeditionary relevance and to enhance operational readiness.
- ***Cooperative Engagement Capability (CEC)*** brings a revolutionary new capability to aviation C2 by distributing sensor and weapons data from existing systems.
- ***Vertical Takeoff Unmanned Aerial Vehicle (VTUAV)*** will be the next generation UAV to support expeditionary maneuver warfare.

MAGTF aviation, through the convergence of the modernized MACCS capability, will be better positioned to provide relevant command and coordination of aviation resources for the MAGTF commander and to foster greater interdependence and closer integration among MAGTF elements. The MACCS must be able to operate wherever and whenever required to support aviation operations.

## *Marine Corps Position*

The Marine Corps continues to pursue new and innovative weapon systems improvements and modernization efforts such as the AV-8B remanufacture, F/A-18A upgrade, EA-6B Upgrades, CH-53E Upgrade, CH-46E ERIP, AH-1/UH-1 Upgrade, ATARS, Fire Scout VTUAV, Pioneer UAV, and Aviation Command and Control Modernization to maintain its combat superiority and tactical relevance in the changing world.